

Name: \_\_\_\_\_

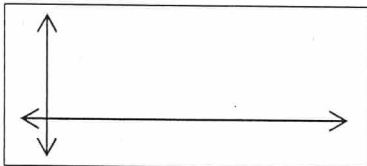
Date: \_\_\_\_\_

# QUADRATICS IN THE REAL WORLD

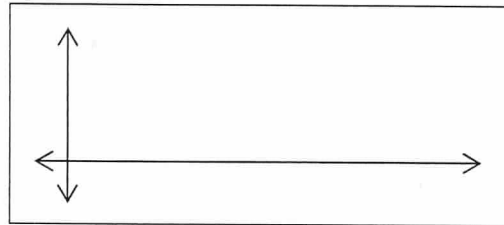
Brainstorm things that take a parabolic shape:

Today, we will explore equations of projectile (a.k.a. \_\_\_\_\_) motion.

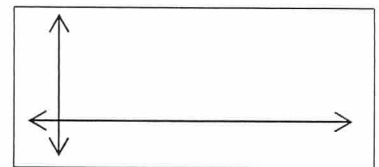
Draw a picture of something being thrown or projected into the air:



(Thrown high for short distance)



(Normal throw)



(Thrown low for long distance)

We could use  $x$  and  $y$  in the equations. Instead, we will use  $t$  and  $h$ .

What does  $t$  represent? \_\_\_\_\_

What does  $h$  represent? \_\_\_\_\_

Using this info, go back to your drawing and label the  $x$  and  $y$  axes appropriately.

There are two spots on the graph when  $h$  will be equal to 0. Describe when they occur.

\_\_\_\_\_

Other than looking at the graph, describe another way we could solve for  $t$  when  $h$  will be 0.

\_\_\_\_\_ : 1. \_\_\_\_\_ 2. \_\_\_\_\_

When the projectile (the object) reaches its highest point in the air, we call that point the

\_\_\_\_\_ (in relation to the graph, it is a \_\_\_\_\_).

How can we find the coordinates of the vertex (the highest point)?

First use \_\_\_\_\_ then, \_\_\_\_\_

Scenario:

It's game day! The Chicago Bears are playing against the Miami Dolphins. The score is tied 35-35 with 45 seconds left on the clock. Robbie Gould kicks the football. It soars high into the air, following the path of the equation  $h = -0.83t^2 + 7.5t$  where  $h$  is height in feet, and  $t$  is time in seconds.

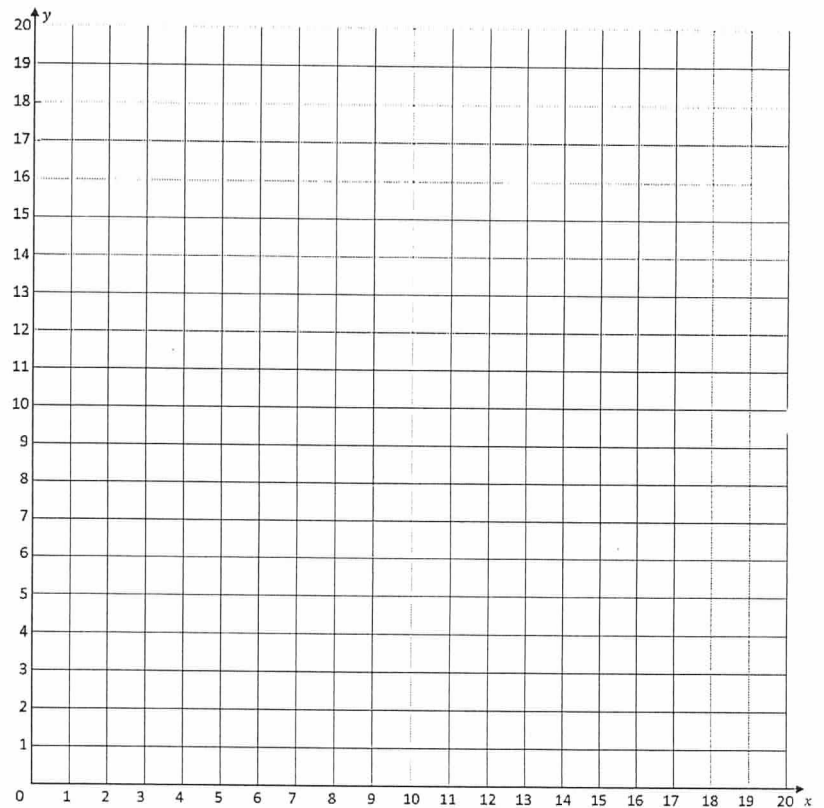
Equation:

Axis of Symmetry:

Vertex:

$t$	$h$

Sketch the graph:



Analysis Questions:

1. What are the zeros (solutions)? \_\_\_\_\_
2. When will the ball hit the ground? \_\_\_\_\_
3. Why are there no negative x-values? \_\_\_\_\_
4. After how many seconds will the ball reach its highest point? \_\_\_\_\_

Scenario:

There is outrage in Beliberland. Teenage girls everywhere are furious over the delay in Justin Bieber's new album release. While some have gone into shock, others are rioting. In Hollywood, a group of hooligans went to Bieber's house, and decided to see how far they could throw him. With a heave ho, the teenagers threw poor Justin in a path that followed the equation:  $h = -0.256t^2 + 4t$ , where  $h$  is height in feet, and  $t$  is time in seconds.

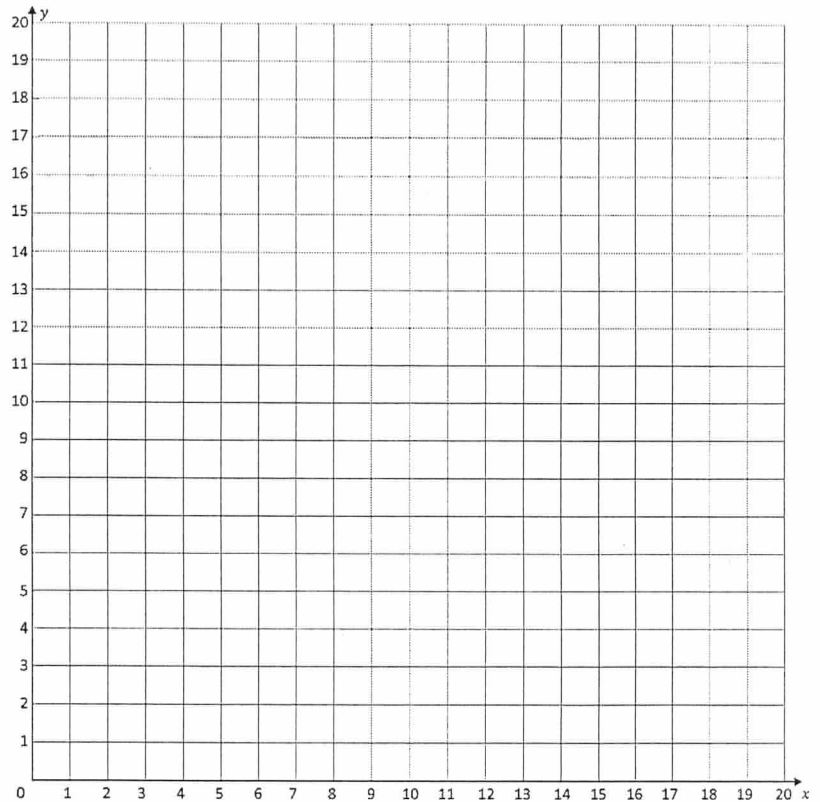
Equation:

Axis of Symmetry:

Vertex:

$t$	$h$

Sketch the graph:



Analysis Questions:

- What are the zeros (solutions)? \_\_\_\_\_
- How many seconds did his body fly in the air? \_\_\_\_\_
- How many seconds until he will reach his highest point? \_\_\_\_\_
- What was the height of Bieber when he reached his highest point? \_\_\_\_\_
- Will he ever reach a height of 20 feet? \_\_\_\_\_